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ABSTRACT

National data regarding occupational and technical training programs in secondary and area vocational schools are useful in describing patterns of courses taken by students and characteristics of teachers. Data are not available on student enrollments and financial investment, student outcomes in general and related to quality of training programs, economic value of vocational education, and labor market relevance of vocational education. For secondary schools, the educational reform movement of the 1980s was built on four pillars: longer school days, longer school years, more rigorous standards for high school graduation, and heightened requirements for entrance to college. An alternative approach to educational reform is "high schools with character." Its four pillars are as follows: integration of academic and vocational studies, cooperative learning, teacher collegiality and collaboration, and a special school identity, commonly established through an industrial connection. A national experiment on high schools with character should be conducted to determine whether schools that fully implemented the concept tend to show greater student achievement than conventional high schools. If they do, the approach would have three benefits: equity in terms of access of students to learning, cost effectiveness, and meeting of the needs of the economy. (Fourteen footnotes and 17 references are appended.) (YLB)

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Working Papers

CURRENT STATE OF OCCUPATIONAL AND TECHNICAL TRAINING: THE NEED FOR INTEGRATION AND HIGH QUALITY PROGRAMS

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Current State of Occupational and Technical Training: The Need for Integration and High Quality Programs

A Paper Prepared for the 1991 CCSSO Summer Institute,
Connecting School and Employment, July 29, 1991

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My current professional interests suggest that I begin this presentation with reference to vocational education, taking it as one of our major forms of occupational and technical training. Certain preliminaries dealt with, I then propose to discuss with you approaches to educational reform of American secondary schools that build upon pedagogical strengths of vocational education while at the same time seeking to transform both academic and vocational education into a new and much more powerful synthesis of instructional practice.

Let's say right off that we have problems of terminology. "Vocational education" as a phrase in the English language means some form of instruction related to work. Students in Harvard Law are certainly engaged in vocational education. However, federal law departs from the common sense definition and restricts the meaning of federally-aided vocational education to preparation for kinds of work that require less than the baccalaureate. The federal definition is inappropriate if the objective of federal policy is to integrate substantive content from theoretical, academic fields with content from fields of occupational development. The federal definition is also out of date, in the sense that many graduates of vocational programs in secondary schools go directly to four-year colleges. Apparently, these students found some relevance in vocational programs for work that is based upon the baccalaureate. For myself, I believe we could move ahead more easily

toward improving occupational preparation if we renamed vocational education as "studies in applied science and technology." For purposes of this paper, however, I stick with the name of vocational education.

I. The Contemporary Scene

A. What National Data Say about Occupational and Technical Training Programs in Secondary and Area Vocational Schools

Let's start with some observations about what we think we know in regard to occupational training in secondary schools (including area vocational schools). The best national data are useful in describing two things: (a) patterns of course taking by students and (b) characteristics of teachers.

1. Patterns of Student Course Taking.

The following data come from samples of high school student transcripts collected by NCES in the longitudinal study *High School and Beyond* (HS&B) for the year 1982 and from the NCES *High School Transcript Study* (HSTS) for the year 1987. The data were analyzed by MPR Associates, Inc., of Berkeley, CA, under contract to NCES, utilizing a "Secondary School Taxonomy of Courses" developed by MPR in 1986. Some illustrative findings are the following:

- Almost all students take at least one course in vocational education: i.e., in both 1982 and 1987, 98% of all high school graduates had included at least one occupational course in their high school programs.

- In 1982, the average number of Carnegie units in vocational subjects was 4.6 per student. In 1987, the average in vocational subjects had fallen--but only very slightly, that is, to 4.4 units.

- The average academic Carnegie units per student increased between 1982 and 1987, rising from 14.1 to 15.6. Likewise, the average total Carnegie units went from 21.3 in 1982 to 22.2 in 1987. The rise in academic course taking was accomplished mainly by students' taking more courses in total (longer school day), rather than by substituting academic courses for vocational and personal/other.

- Within the occupational curricula, relative popularity of fields in 1987 may be indicated by the proportions of high school graduates taking courses in particular fields, as below:

	%
Business	53.8
Trade and Industry	37.0
Technical and Communications	24.7
Occupational Home Economics	10.6
Marketing and Distribution	.7
Agriculture	8.0
Health	4.9

- In 1987, the average number of vocational courses taken was virtually equal for all main ethnic groups except Asians. Asians took fewer vocational courses.

- The average number of vocational courses taken by males and females was approximately equal in 1987.

- The average number of vocational courses taken in 1987 showed a steady decline as size of school increased.

- Rather few students whose grades were "mostly A's" took large numbers of vocational courses. An exception is in the field of technical / communications, where the largest single group of participating students by course marks was the "mostly A's" group.

- For most high school students, time spent in academic courses dominated time spent in vocational subjects by a wide margin. In the category of students taking between 4.0 and 5.99 Carnegie units in vocational education, the averages in 1987 were 4.70 vocational and 14.93 academic. Even for students who had 6 or more specific labor market courses, the average relationship was 8.78 vocational and 11.84 academic.

Please allow me three points of elaboration of the above data.

First, up to 1987 at least, vocational education was not fading away, or not fading away very fast. Rates of participation of students in vocational education during the middle part of the 1980's decade of reform look remarkably steady.

Second, the data appear to reveal ambiguities in the concept of tracks. Consider the following quotation from a recent ETS publication. "The students who are truly 'forgotten' are not the 24 percent in the vocational track, nor, certainly, the 25 percent in the college-prep track of the nation's high schools. The most neglected students are those who follow the general track in high school, which does not require either a strong academic or vocational focus." [1] The statement implies that there are three clearly defined tracks in secondary schools. The data noted above suggest an alternative interpretation.

Almost all students take some vocational education and almost all students take more academic courses than occupational. Setting aside (for the moment) vocational magnet schools and academy programs, students who enroll in any more occupational education

than the odd course in keyboarding, or a course to satisfy an avocational interest, are likely, common observation suggests, to take their academic courses from the general track. Assume now that the general track courses make few demands of academic rigor on students and that the vocational courses, technical courses excepted, deal mainly with entry-level skills and not career development. The real separation in high schools would now appear to be between college-prep programs and "everything else," with students in everything else spending a majority of their time in low-level academic courses, supplemented by varying amounts of job-specific, theory-free vocational work. Students may graze contentedly over that instructional landscape, possibly without realizing the significance of loss of intellectual stimulation for their adult lives.

Three, the finding that students who take more than an average amount of vocational education, technical fields aside, receive rather few "A's" may be related to their lack of innate ability, true. But in very many cases, this apparent lack of intellectual agility, fostering the assumption that such students cannot succeed in the college-prep track, may reflect their differences in learning styles. Possibly theoretical, abstract knowledge, the stuff of intellectual rigor, if offered in a set of non-traditional learning styles, could become available to them. Evidence, though still fragmentary, suggests that this may be true. These are points to which I would like to return.

2. Characteristics of Teachers

The data to follow are from the 1987-88 *Schools and Staffing Survey* of NCES, as analyzed by Phillip Kaufman of MPR Associates.

In certain important aspects as of 1987-88, vocational teachers are very much like academic teachers.

- 46.9% of vocational teachers hold bachelor's degrees and 39.3% have master's. The corresponding figures for academic teachers are 45.6 and 45.3.

- 61.8% of vocational teachers began teaching under the age of 25 and 24.9% entered teaching between the ages of 26 and 35. For academic teachers, the corresponding figures are 70.1% and 23.0%.

- 24.9% of vocational teachers and 24.7% of academic teachers have over 20 years of experience.

- 91.3% of vocational teachers and 89.3% of academic teachers hold standard state teaching certificates.

There is, however, one important kind of difference between vocational and academic teachers, namely, major field of study at the bachelor's level.

- For academic teachers, the distribution of undergraduate majors was as follows: mathematics and science, 15.8%; social sciences, 10.9%; letters and humanities, 10.3%; general education, 49.0%; and vocational education, 5.4%. For vocational teachers, the corresponding distribution was mathematics and science, 2.8%; social sciences, 3.6%; letters and humanities, 1.4%; general education 11.1%, and vocational education, 78.3%.

An observation: The stereotypical view of the vocational teacher as unschooled and uncertified, as a person who enters teaching in mid-career after working 10 to 15 years in a trade, appears to be beside the mark. On the other hand, if integration of academic and vocational studies is a proper object of educational policy, then academic and vocational educators have little common ground in their academic preparations, at least as measured by

their undergraduate majors. One may raise a question as to how well a general education major (for 49% of academic teachers) serves to prepare a high school teacher to instruct in literature, history, mathematics, and science. Likewise, one may wonder how well a vocational major equips a vocational educator to deal with the theories that undergird production processes, whether they be in manufacturing, agriculture, health, etc., especially in a time when so much economic production is no longer "hands-on" but computerized.

B. What National Data Do Not Say about Occupational and Technical Training Programs in Secondary Schools

1. Student Enrollments and Financial Magnitudes

Each of you may have a pretty clear idea of student enrollments in vocational education and related programs in your own states. Nevertheless, there are no national data of such a kind. Likewise, there are no nationally-aggregated data about state/local expenditures on vocational education. The Statistical Abstract of the United States has 75 expansive tables on education, K-12 and post-secondary. The tables cover enrollments, completions, finances, etc., down to such detail as "School Days Lost Associated with Acute Conditions, 1962 to 1987." There is not a single table that describes anything about vocational education, beyond one line in one table that shows federal grants for vocational education and one line in another table that refers to vocational rehabilitation of veterans.

Standard explanations for the paucity of information are difficulties of gaining state-by-state agreements on definitions of vocational education, differences in methods of counting vocational enrollments, and the general absence of program accounting in secondary schools. The absence of the kinds of data cited here forestall the conduct of cost-benefit studies in school-based occupational training.

2. Student Outcomes in General and as Related to Quality of Training Program

As far as I have been able to determine, there are no national data on achievement and aptitude of vocational concentrators as distinguished from the secondary school population overall. What would be particularly useful would be a set of student outcome measures by means of which one could compare results from training programs that are judged to be exemplary in terms of their processes of instruction with results from programs that are judged to be still in an early stage of development. These sets are available only in fragmentary form. I shall comment on these fragmentary sets of data later.

3. The Economic Value of Vocational Education

Between 1979 and 1990, 19 studies of the economic value of vocational education were made. The standard approach was to compare post-school income/earnings of vocational concentrators with school leavers who had not had any significant amount of occupational training in school. Considerable effort went into the selection of matched comparison groups or, using advanced econometric techniques, to adjust for any lack of comparability. The results are not robust. At best, one can report a "weak positive" relationship between school-based occupational education and income.[2]

Most of the later--and better-designed--studies are based on national samples, i. e., the longitudinal studies of the U. S. Department of Education. The data thus represent a national average of experience and give little to state and local policy discussions on questions of what kinds of vocational programs to expand and what kinds to contract. It would be much better to have reliable evidence to distinguish high yield programs from low yield. This is what the tracer studies, coming up next, were intended to do.

4. Labor Market Relevance of Vocational Education

In a sense, this topic is simply an applied version of the last, namely, the economic value of vocational education. And this version, in my opinion, is a big one of information deficiency. Traditionally, vocational educators have sought to determine if their graduates find employment quickly and if they obtain employment in a line of work related to their training. (Alternatively, vocational educators collect information on how many of their graduates enter post-secondary education.) However, the National Assessment of Vocational Education conducted in the years 1978-82 (the one before the most recent) raised serious doubts about the quality of data in these tracer studies. Even if the tracer studies were done perfectly, they would more readily identify the existence of skills surpluses--that kind of imbalance--than they would skills shortages.

In the vocational education world, local advisory committees carry the burden of assuring sufficient supplies of particular entry level skills and informing secondary school faculties about changes in skills requirements within given lines of work. My observation suggests that these committees can be effective in small to middle size school districts, especially to help school staff meet the needs of small business, but that they seldom are able to function well in very large districts.

The allied health field demonstrates another kind of problem. As I noted above, data indicate that only 4.9% of high school graduates in 1987 had taken courses in health occupations. A recent study of NCRVE by Paula Hudis indicates an unmet demand for health professionals, relating to (i) aging of the population, (ii) an expanding immigrant population, (iii) the impact of HIV/AIDS, (iv) rising numbers of low birth weight babies, and (v) introduction of new technology. The imperative of cost containment eventually should moderate demand for health professionals, but its immediate impact appears to be to

heighten the search for highly skilled persons who can help raise productivity in health care institutions.[3]

The relatively small place health occupations hold in secondary vocational programs, as compared, say, with cosmetology, may reflect not lack of labor market demand but cost. As the NCRVE study states: "Allied health and nursing programs have been expensive to establish and run compared with many traditional academic programs--both due to the cost requirements of new technologies in fields such as medical imaging and the low student/teacher ratios required for instruction in other fields such as nursing....because allied health programs are expensive, they are often vulnerable to cutbacks."[4] Another probable constraint is a shortage of well-trained faculty for secondary programs in health fields. We lack a national policy for the recruitment and preparation of such teachers.

Along the same line, I would like to make passing reference to the now-familiar "high skills or low wages" argument.[5] I fear we run the risk of slipping into what Oxford economists David Finegold and David Soskice call a "low skills equilibrium."[6] The idea is that gradually, very gradually, the top levels of skills in our country fall below standards of competencies of workers in Europe, Japan, and the rising stars in the East Asia economic scene. American employers respond by making goods and offering services that are just a bit easier to create, avoiding any suggestion of a "skills crisis." But the process can be inexorable, and after a decade or two, we end up competing in the production of pots and pans with the less economically-progressive nations of the Third World. At that point we become stuck--that's what "equilibrium" means in economics--because there's no one left with really high grade skills to pass along those skills to other people. Because the process is slow and easy, we fail to become alarmed until it is too late for us to maintain a decent standard of living in the future--in terms, at least, of what we have known in the past.

Our vocational programs tend to treat all skills within their domain as being of equal value. Morally, that's fine, but for our position in the international economy, let's face it, some skills are more equal than others. Some of our best training is for work in the construction trades. I hope that training stays good and gets even better. However, house construction is a relatively protected labor market, meaning that we don't compete much with Japan in residential housing. Many other lines of work are shielded from foreign competition, including many in the service sector--yes, cosmetology again. It might be wise to establish a national policy for a "skills strategy," under which special efforts would be made to enhance training in jobs that are internationally competitive, job oftentimes found in manufacturing, both durable and non-durable. If this is a form of protectionism, it would certainly be more beneficial than tariffs.

II. Main Assumptions of Current Secondary School Reform: The Four Pillars

For secondary schools, as I see it, the educational reform movement of the 1980's, now continuing into the 1990's, has been built on four pillars:

- longer school days,
- longer school years,
- more rigorous standards for high school graduation,
- and heightened requirements for entrance to college.

Each of you would probably say that there is more to it: site-based management, mentor teachers, application of tenets of the effective schools program, etc. Nevertheless, from a national perspective, I suggest that the four pillars represent the most common elements of reform across the states.

If so, what are the main assumptions of the educational reform movement in secondary schools? Please allow me, for discussion purposes, to offer my list.

- Standards of instruction and student performance outside the college prep track are grossly inadequate.

- The academic content of the college prep track would serve the needs of virtually all students if virtually all students could master it.

- For this to happen, for most students to master the college-prep curriculum, more time of students in study is required.

- And student motivation to study must be heightened.

- But no change in "approved instructional practice," meaning the ways that students and teachers do their work together in the college prep track, is required.

From the assumptions as listed, one can move immediately to policy prescriptions of longer school days and longer school years. How to raise levels of student motivation is a more difficult question, but the approach taken appears to be the following: raise the prices of the only worthwhile prizes now offered by secondary schools, namely graduation and college entrance. These prizes continue to be earned by individually competitive behavior.

The attempt to force feed academics, absent changes in the ways that students and teachers work together, has not been resoundingly successful. I know there have been success stories in various places at various times. I agree that reform takes a long time and that it may be too early to evaluate results. Nevertheless, it does not yet appear that the types of reform efforts so far pursued are having strongly positive results for the great majority of students, nor especially for those in our inner cities. While there were modest gains during the 1980's in the percentage of 16 to 24 year olds enrolled in four-year colleges, the percentage of 25-29 year olds completing four years of college was flat. (This

in spite of a widening gap between earned income of high school and college graduates.) In 1980, the percentage of 17 year old students who scored at or above 350 on the NAEP reading scale was 5.3; in 1988 it was 4.8. In 1978, the percentage scoring at or above 350 on the NAEP science test was 7.4; in 1988, it was 6.5. In 1977, the percentage scoring at or above 350 on the NAEP science test was 8.5; in 1988, it was 8.2. [7]

III. Main Assumptions Underlying High Schools With Character: The Four Pillars

I would now like to talk about an alternative approach to educational reform in secondary schools. This approach has been searching for a name, and the best name to come to light so far is "high schools with character," as proposed by Paul Hill of RAND.[8] (Gene Bottoms of SREB calls them "focused schools.") Let's stick with Paul for the time being and use an acronoym--HSC. The HSC approach accepts the first assumption of the traditional school reform movement, namely, that standards of instruction outside the college prep track are deplorably low. It supports policies to lengthen the school day and year. The HSC group, if I may call it that, agrees that student motivation is a major problem. I would emphasize that differences between traditional reform and HSC are not about academic rigor.

The differences, as I see them, are two fold. First, the HSC group does not hold that the conventional college-prep curriculum would serve the needs of virtually all students, even if virtually all students mastered it. The main reason for the position is the difficulty that many people have in transferring college prep learnings from the classroom to their lives as workers and citizens.

The second point of difference of HSC, as compared with 1980's reform, is to assert that high schools can serve the large majority of students successfully if, but only if, profound changes are made in the ways that learning materials are presented, in the ways

that students and teachers do their work together, and in the provision of a strong element of "character" or "focus" in the identity of a high school. Ordinarily but not always, this element of identity is established through an industrial connection.

These points of difference lead us to the four pillars of high schools with character:

- Integration of academic and vocational studies
- Cooperative learning on the part of students
- Collegial work on the part of teachers
- A special school identity, commonly established through an industrial connection.

IV. Why It Might be Worthwhile to Establish and Evaluate a National Sample of High Schools With Character.

This sounds like a pretty big bill of goods, though I am pleased to be able to say that HSC, with all four pillars more or less in place, do exist. One can observe them in operation. Are there many of them? No, rather few, up to the present. Have they been evaluated, which is to say do we know that they are successful? To a limited extent, as I shall indicate below, but the evidence on their success remains fragmentary. To understand the potential of HSC, if any, we need more experimental sites and thorough evaluation.

Does pedagogical theory support the concept of HSC sufficiently to allow a national experiment? In my opinion yes, but obviously it's your choice, not mine. (The vehicle at hand is Perkins II.) I shall now give some arguments in support of HSC, speaking as a member of NCRVE. Others on your program have far stronger background in theory than I, so I report simply on work sponsored by our Center and work that is being carried forward by my colleagues at Berkeley.

1. Integration of Academic and Vocational Learning

What is integration of academic and vocational learning? Some people might say that integration occurs when a vocational teacher, working alone in an isolated classroom, adopts a course such a "Principles of Technology," as developed by CORD. With all respect to the pioneering work of CORD and to the efficacy of their courses in the two-year versions, the associates of NCRVE hold that integration implies more than this. To us, it means revising processes of instruction such that academic programs display bountiful applications of theory, i.e., what the theory is used for, while at the same time the vocational programs incorporate theory that supports the practical skills that are being learned. In the ultimate case, the distinction between academic and vocational teachers vanishes. Ellen Russell, former principal of the Chicago High School of Agricultural Science, dared me to visit classrooms in her school and then tell her which teachers were in which category, academic or vocational. She won.

What are the pedagogical principles involved in integration? The lineage extends at least to the 19th century. Francis Parker was a forebear and John Dewey incorporated the principles of integration into the laboratory school at the University of Chicago.

> The Dewey curriculum was organized around occupations: gardening, work with textiles, scholarly research, producing artistic works, manufacturing, and exploring unknown territories. The study of occupations permitted students to learn in ways that were natural and interesting to them. Occupations always involved doing something. They engaged and developed the child's motor skills and "hands=on" modes of learning. They involved making observations, analyzing, investigating, quantifying, and making predictions, thus developing the child's scientific skills. They involved other people and thus encouraged the child's social skills and interests. They required the exchange of ideas, thus providing opportunities for training in communications.[9]

Today, scholars such as Sylvia Scribner, Senta Raizen and Jean Lave maintain the tradition of integrated learning. Instruction is developed in a problem-solving manner,

building upon the natural interest of students in "how things work." (Parenthetically, I have never understood how the study of technology can be regarded as anti-intellectual. Does not the genius of Leonardo deny such a position?) Most students today find work invisible (except that kind of work that they may do part time at MacDonald's). Students do not see the baking of bread, the bending of iron at the village smithy, the making of clothes and vehicles. Work has become invisible partly as a consequence of the nature of large-scale capitalist production and partly as a consequence of technology--who can watch a computer do what computers do? But if work is invisible in the "real world," its nature is of compelling interest to students. Natural curiosity so declares, but students also realize that having work means access to material goods.

May not one surmise that a curriculum that builds upon natural interests of students, in which students engage themselves in projects involving a certain amount of manipulation of physical objects and in which students explore multiple or alternative solutions to real world problems (how to build a solar car, how to re-build their community), may not one surmise that such a program would have pedagogical power over lecture and text, blackboard and chalk, 50 minute periods of courses unrelated to each other or to the real world? The trick is to see that the academic domains are represented in rigorous measure. Academic educators and vocational (as a generality) bring different strengths to the table, with the academic providing intellectual rigor and the vocational offering pedagogy and sociology of learning. In my opinion, the building of academic and vocational teaching teams, otherwise called integration, is worth a fair test.

2. Cooperative Learning

In simplest terms, cooperative learning means that students spend a not-negligible proportion of school time working in groups, most often on group projects. For example, at Thomas Jefferson High School for Science and Technology in Alexandria (a high end

example of an integrated program/cooperative learning), I visited with a group of six students working in a dark room on laser experiments. The instructor was not in evidence during the time of my visit, but the students were clearly engaged and closely involved in their work. As they watched the laser beams go through their gyrations, they posed a constant stream of questions to each other and seemed to reach tentative agreement on how to move the experiment to a higher stage of analysis. Some of the student projects in Thomas Jefferson are related to actual R & D work in the labs of the high tech firms in Northern Virginia.

Cooperative learning does not imply a complete absence of competition. Students, after all, need to know how their works compares with the work of their peers. Part of a student's program is individualized. Additionally, student teams compete against student teams, either within their own school or with teams from other schools. Taking the example of Thomas Jefferson again, a team from that school won a national contest in supercomputing. The prize was a supercomputer to take back to the school. Thomas Jefferson won a similar contest a second year and received dedicated use of a supercomputer for a year. One high school, two supercomputers.

One of the main, assumed advantages of cooperative learning is to turn students from passive to active learners, meaning that students are helped to take charge of their own learning processes. In passive learning, the student takes notes from the instructor's lecture, receives text assignments from the teacher, has his work marked by the instructor, and, in general, takes the attitude that learning is fully directed by the teacher and can't occur in the teacher's absence. If, as is now frequently said, this country needs a workforce that is capable of lifetime learning on the job, a passive attitude toward learning is not helpful, to say the least.

In active learning, students gain confidence that they can learn as members of a group with or without the presence of a teacher. They also gain confidence in their capacity to learn using their own individual resources. These skills, I suggest, are important for lifelong learning in the workplace, but there is even more. High performance firms expect experienced workers to pass along information about technological processes; that is, firms expect workers to be able to teach each other. In cooperative learning groups, students function as both learners and teachers of each other. Hence, they come to see teaching as an easy and natural act.

In writing about active learning, and about how the instructor "fades" as the learning group approaches maturity, Professor Alan Schoenfeld, cognitive scientist in the mathematics, science, and technology group at the University of California, Berkeley, has stated:

> I have a sense of what...problems will serve as fertile sources of ideas and explorations...It is essential for me to find fertile grounds for mathematical exploration...it is equally essential for me gradually to remove myself from the process, moving to the side and prompting the group to resolve issues by itself. I remain engaged as a member of the community, making sure the appropriate mathematical ideas are respected (Are we really sure? Is there a counterexample?). I refrain, however, from pronouncing what is right and what is wrong; I pose the issues and leave it (for as long as possible) for the class to resolve them....The students work in small groups for perhaps half the class. Then we convene as a whole to discuss these problems....One day toward the end of the term I had an unavoidable conflict during the first part of the class. I asked a colleague to hand out my problem set; the students could work by themselves for a while and I'd join them when I could. Unfortunately, I was detained, and only managed to get free after the class was over. I ran to the room where the class met, arriving fifteen minutes after the class should have ended. All the students were still there, still in small groups, arguing over the problems.[10]

3.Teacher Collegiality and Collaboration

Serious efforts to achieve integration of academic and vocational studies must be based on collaboration among teachers. In schools that appear to have advanced furthest along the path to integration, NCRVE researchers find an important pre-condition of

success; namely, that almost all teachers in the school have a single time in the week to meet and work together as a whole school group. Advanced forms of integration afford clear examples of collegial performance: team teaching by academic and vocational faculty, joint design of programs, collaborative efforts in writing problem sets and other instructional materials, common efforts in devising new schemes of student assessment, etc.

Interestingly enough, teacher collegiality has come under study as an important aspect of teachers' professional behavior quite independently of the integration movement in vocational education. One of the leading scholars to examine the nature of teacher collaboration is a colleague of mine at Berkeley, Judith Warren Little. Professor Little maintains that teacher collegiality can have, depending on its nature, either strong positive effects on the operation of schools and on the achievement of students, or negative effects. Her research also indicates that teacher collegiality is a rather fragile phenomenon in the life of an educational institution.

Nevertheless, when it works right, schools become better off. Professor Little lists the following "benefits to the school" that accrue from positive collegiality.

> Increasingly, schools must bolster public faith and enlist public support by showing that they are capable of meeting complex demands with an ever more diverse student population. Yet the twin demands that schools show steady improvement and that teachers 'be professional' cannot plausibly be satisfied by the individual efforts of even the most capable, energetic, and dedicated teachers.
>
> One feature of steadily improving schools is that they are organized to influence teaching....Teaching in such schools is a public enterprise. The broad values that guide daily decisions, expectations for student learning, ideas about how children learn and what we as a society wish them to learn, the planning and conduct of instruction, recurrent dilemmas in fostering student motivation and judging student progress, the principles for organizing life in classrooms--all receive the collective attention, scrutiny, insight, and refinement of peers acting as colleagues.
>
> Schools stand to benefit in three ways from promoting closer collegial ties among teachers. Schools benefit first by simply orchestrating the daily work

> of teaching across classrooms. Teachers, students, and parents all gain confidence in their knowledge of what is taught throughout the program and why. Teachers are better prepared to support one another's strengths and accommodate weaknesses.
>
> Second, schools that promote teacher-to-teacher work tend to be organized to examine and test new ideas, methods, and materials. They are adaptable and self-reliant in the face of new demands; they have the necessary organization to attempt school or classroom innovations that would exhaust the energy, skill, or resources of an individual teacher.
>
> Finally, schools that foster collegiality are plausibly organized to ease the strain of staff turnover, both by providing systematic assistance to beginning teachers and by explicitly socializing all newcomers to staff values, traditions, and resources."[11]

In meeting the requirements of collegiality for real integration of academic and vocational studies, HSC provide institutional support, a *raison d'etre*, to maintain and extend teacher-to-teacher work and to reap the positive benefits that Little describes.

4. Establishing Character in High Schools With Character.

The fourth pillar of reform in HSC is the establishment of a special identity. One of the first projects of NCRVE at Berkeley was to prepare a set of case studies about a set of specialized vocational high schools in New York and Chicago, along with a set of area vocational schools in Southern California.[12] Especially in regard to the New York and Chicago schools, we observed some common attributes, among which the following are noted here.

1. The schools have a dual mission: to prepare students for an occupation and for entering college. The occupational preparation extends considerably beyond the inculcation of entry level skills; it is really preparation for a career. However, and at the same time, the schools intend that no student be tracked away from attending

college, including four-year college. The result is an increase in student options upon graduation.

2. The schools achieve a high degree of integration of academic and vocational instruction. This is fostered in part by strong connections to an industry (health, financial institutions, communications, agriculture, fashion, construction trades, i.e., the "built environment," transport, hospitality) or to a set of disciplines, e. g., mathematics and science. Often there is also a link to an institution of higher education.

3. Teacher and student collegiality is promoted by a common interest in an industrial connection or in the disciplinary focus.

4. The school holds strong expectations for all students to succeed, accompanied by attempts to minimize grouping of students by ability.

5. The schools have an admission process that makes students feel special--based on student interest in the career speciality or set of subjects, and not solely on test scores.

I am speaking here basically of inner-city schools. Authors of the case studies of what we then called "exemplary urban career-oriented schools," including me, were tremendously impressed with the apparent quality of their programs. Case studies, however, do not provide the necessary documentation of effectiveness. NCRVE subsequently is obtaining from Robert Crain of Teachers College an extensive analysis of student performance in such schools in New York City, based on over 4,000 student records, by means of which it will be possible to compare the work of students admitted to specialized schools and programs (schools within a school) by lottery, i. e., random

selection, with their peers who did not gain admission and who attended zone schools. The results support superiority of student performance in specialized programs and especially in stand-alone schools, as compared with unspecialized comprehensive institutions (zone schools).

This study is important because it reports on the performance of average and below-average youth in vocational magnet schools. Many magnet schools have admissions standards for all their students, and their performance as schools, assuming it is superior, is attributable in part to selectivity bias. As noted above, the target students in this study were randomly assigned to the magnet schools by the New York City Board of Education, and they are compared with a group of their peers in regular comprehensive schools. Several different measurements of student characteristics indicate that the target population and the comparison group are virtually identical, and they both represent a cross section of average and below average secondary students in New York City.

The results of the investigation are, for technical reasons, conservative. The results so far are derived from only one year in the lives of the students, namely, the 9th grade. Nevertheless, I find them impressive.

> Many of the effects shown should be considered large....we would estimate that low readers (bottom 16%) who applied to, but were not accepted by the total magnets (stand-alone schools) are two to three times more likely to drop out than go to their comprehensive schools. In total magnets, a low reader is three to four times more likely to pass Regents' math than he would be if he were in a comprehensive school. Average readers in magnet schools (whether total magnet or in schools-within-schools) improve their reading scores half again more than they would in regular schools.Sixty per cent of the average readers in total magnets earn more course credits than the average student in regular schools.[13]

Concurrently and independently, Paul Hill of RAND has examined thirteen "high schools with character" in New York City. The HSC showed superior results over zoned

schools in regard to percentage of students graduating, percentage taking the SAT, average combined SAT scores, and percentage of black students above mean for black students.[14]

I would like to say a bit more about establishing "character" in a high school through an industrial connection. It is a fact of American life that most high school students work during the time that they are in school. What do they learn from the work experience? They may learn that work is boring and repetitive, that workers are not expected to make independent judgments, and that career ladders are very short. Or students may see work as interesting, and challenging, with multiple routes to advancement for those who are willing and able to learn in the workplace. NCRVE research, the work of David Stern and his colleagues at Virginia Tech and Minnesota, indicates that there are strong differences in the quality of work experience for high school youth. "Pick-up jobs" tend to give students a negative impression of work, as defined above. Work experience programs that are designed jointly between schools and employers, with mentors provided in the workplace, are more likely to afford students a positive impression of work and to show the importance of applying cultivated intelligence to work tasks. This is one reason, I suggest, for establishing character in high schools through an industrial connection, i. e., the greater likelihood of the availability of higher quality work experience for students.

A second reason is the possibility that the industrial connection will help students relate their cooperative learning projects to R & D activities, or to similar activities in real workplaces. Thirdly, the industrial connection improves the probability that teachers will help students develop a "strong understanding of all aspects of the industry they expect to enter," an important requirement in Perkins II for the uses of federal funds. Lastly, close industrial connections improve the chances that enterprises will donate equipment and services of mentors to school programs.

Please allow me one more anecdote. I was able to visit two vocational schools in Washington, D. C. The first had mainly a male student body and offered instruction in a variety of fields: auto body, auto mechanics, construction trades, and some others. The labs at least during the time of my visit, appeared to be very much under-utilized. Faculty pointed to a number of problems: loss of faith in the value of vocational education, parents uninterested in trying to get their children to attend school regularly, bad academic preparation of students through middle school, inadequate equipment and supplies. In contrast was a second school serving mainly female students, with concentration on the health professions. The second school was very busy and it was an exciting place to be. Groups of students were leaving to attend a kind of internship program in a nearby hospital and other groups were returning. There was a lot of comraderie among students and between students and faculty. The course in anatomy seemed to meet a good standard of intellectual rigor. The principal explained that she and members of her faculty visited certain elementary schools several times each year to interest students in a career in health. They also visited the middle schools linking the elementary to the high school to encourage middle school faculty to see to it that students interested in health careers took pre-requisites of algebra I and biology, in order that they could do well in the hard courses they would meet in high school. Both schools were inner-city and both were minority. One appeared to be successful and one not. Plainly, the principal's leadership was important in the apparent success of the health-related school, but the industry connection helped give her leadership a focus and gave point to her relations with the elementary and middle schools from which she drew her students.

V. Suppose High Schools With Character Work Better than Conventional Schools--Why Might This be Important?

If there were to be a national experiment on high schools with character and if it turned out that the schools that fully implemented the concept tended to show greater student achievement, selectivity bias aside, than conventional high schools, why might this important? I suggest there are three reasons.

1. Equity in Terms of Access of Students to Learning

One of the primary values in American education is equality of opportunity. We would find it abhorrent if a school district denied admission to high school to locally-resident youth, aside perhaps to youth known to be disruptive and dangerous. In the physical sense, public schools are open to all students who meet residency requirements. Suppose student A is comfortable with academic instruction as it is presently presented and is somehow known to reach the 80th percentile on a basic standardized test. Suppose student B has a learning style that does not allow him to do well in academic studies as presently conducted. Student B has two choices: enter the college prep track and receive low or failing grades, or take some combination of courses from the general and vocational tracks, all being mostly devoid of intellectual stimulation. At the end of high school, student B is at the 50th percentile of achievement.

Suppose, finally, that student B, if enrolled in a high school with character, having integrated instruction, programs of cooperative learning, etc., would be known to complete high school at the 80th percentile, i.e., equal to the performance of Student A. If the hypothetical turned out to be true, then it would appear that Student B had been denied equal access to education because he had a different learning style from student A. Obviously, public schools cannot accommodate to microscopic differences in learning

styles, but if there is a substantial proportion of students who can perform better in high schools with character than in the traditional college-prep programs, then the establishment of such schools would improve access to learning and would be a major gain in making equality of opportunity a reality. I would emphasize again the objective of many such students should be to go straight to four-year college. It's not the end objective of learning that is the primary issue; rather it is how to open the door to learning accomplishments for a much larger group of young people than our schools now serve well.

2. Cost-Effectiveness--for a Modest Increase in Expenditures, Reduced Drop-Outs, More Rigorous Courses, and Higher Tests Scores

Schools have been subjected to a barrage of complaints that expenditures per student spiral upward but measured student accomplishments do not. High schools with character are not necessarily more expensive than regular schools, especially if the school obtains some equipment and supplies from its industry connection. If these specialized schools developed a good record in curbing drop-outs, offering courses in which students progressed to higher levels of academic rigor, and provided, eventually, higher test scores, the public schools would have the opportunity to restore public faith in the educational enterprise.

3. Meeting the Needs of the Economy

To avoid the possibility of falling into a low-skills equilibrium, as defined above, schools should seek to send into the workforce people who can combine three roles--that of worker, learner and teacher. High performance firms seek workers who can identify and solve problems, deal comfortably with abstractions, perform the mathematics of quality control, and gain comprehensive understanding of the operation of whole systems of

production. The argument is familiar, even if not all economists and employers agree that our future rests upon the shoulders of a workforce adept in thinking about work, at work.

Better to be on the side of caution. If America does need a thinking workforce, if the "command economy" of the large-size workplace is to give way to reliance on decentralized decisions of individual workers, then attributes of high schools with character appear important, particularly contextual or situated learning, and the inculcation of the habits of mind associated with with cooperative learning.

VI. A Few Modest Proposals

From the above discussion, I have two proposals. The first is that we should establish a "national skills strategy," under which (a) we reach agreement on national economic goals of the highest priority, of which international competitiveness might be one and (b) determine which kinds of work skills are essential to meet those goals. Nothing like this can be done with precision, but it would be preferable, in my opinion, to try to define some objectives and priorities, even if only approximately, for our educational and training institutions over five and ten year planning periods. SCANS takes us some way in this task, but I would judge that the Commission's work is more focused on generic skills for high performance firms and not much on what kinds of skills for what lines of work. The skills strategy should take account of the needs of private enterprise but also of public, as in the health and education fields. Training in skills in fields that were not deemed strategic in the current planning period would continue and possibly expand, but the skills strategy would offer guidance on which skills are in seriously short supply, in what fields preparation of skills should be markedly upgraded, and what new kinds of skills should be developed. What I am suggesting is not conventional labor force projections, but the relating of skill needs and training priorities to a set of national economic objectives.

The second proposal is that the skills strategy be complemented by a "training strategy." The training strategy would attempt to evaluate alternative processes for developing the skills identified for priority treatment in the given planning periods.

The training strategy might well include innovative and experimental practices in training, as well as tried-and-true methods. On the innovative and experimental side, I would hope that each state could establish at least one high school with character. A national network of experimental sites could provide a lot of information about these specialized schools, information that we certainly do not have enough of. Some boost toward this effort could be found in Perkins II, the act that Betsy Brand has so accurately described as a 'window of opportunity.'

The relation between Perkins II and high schools with character should be favorable, in that money is provided for integration of academic and vocational studies and money in most states flows to larger cities, the traditional home of HSC. The relation of Perkins II to HSC is not, however, complete. HSC build upon the pedagogical strengths of vocational education but they are not vocational programs as we have known them in the past. Neither are they academic programs as we have known them in the past. They represent a synthesis of academic and applied studies and they need the active and intense involvement of academic teachers as well as vocational. It is possible to use Perkins funds to attract the interest of academic teachers, but to do so will require commitment from you, the Chief State School Officers.

It will be easy, alas, to give lip service to the ideas imbedded in Perkins II. We need more than empty models of compliance, and we need more than sincere but incomplete efforts to test the Act. It would be a pity to waste the opportunity for rigorous examination of major changes in the way that high schools go about their work. That is

why I suggest that each state create at least one exemplary, complete high school with character, preferably of a stand-along type.

FOOTNOTES

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4. Ibid.

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6. David Finegold and David Soskice, "The Failure of Training in Britain: Analysis and Prescription," Oxford Review of Economic Policy, Vo. 4, No. 3, 1988, p. 22.

7. Educational Testing Service, Performance at the Top: from Elementary Through Graduate School, Princeton, the Service, 1991.

8. Paul T. Hill, Gail E. Foster, and Tamar Gendler, High Schools with Character, Santa Monica, RAND, 1991.

9. Sue E. Berryman, "Cognitive Science: Indicting Today's Schools and Designing Effective Learning Environments," New York, Teachers College, Columbia University, unpublished manuscript, 1991, p. 14. I am greatly indebted to Dr. Berryman for help in the argument of this paper.

10. Alan H. Schoenfeld, Ideas in the Air, Palo Alto, Institute for Research on Learning, Report No. IRL88-0011, 1988, pp. 12-13.

11. Judith Warren Little, "Teachers as Colleagues," in V. Richardson-Kilheck, ed., Educators' Handbook: A Research Perspective, New York, Longman, 1987, pp.501-502.

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14. Hill, et al., op. cit., p. 32.

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